Hospital Building Safety Board
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MEETING REPORT
HOSPITAL BUILDING SAFETY BOARD

Ad Hoc Committee on Structural Regulations

Wednesday, December 2, 2009
10:00 a.m. - 4:00 p.m.

Office of Statewide Health Planning and Development
400 R Street, Suite 317
Sacramento, CA 95811

Committee Members Present
Trailer Martin, Chair
Joe La Brie, Vice-Chair
Simin Naaseh
Jennifer Thornburg

Consulting Member
Jackie Vinkler

OSHPD Staff Present
Paul Coleman, Deputy Director
Mohammad Karim
Chris Tokas
Tom Hale

HBSB Staff
Linda Janssen, Executive Director
Chris Mooring
Carol Wilfley

Welcome and Introductions

Committee Chair, Mr. Trailer Martin, called the meeting to order at 10:00 a.m. He welcomed the participants and asked them to introduce themselves. Committee Vice-Chair, Mr. Joe La Brie, encouraged the group to deliberate as a body working together and to come to consensus. Hospitals need help and relief; much work is going on with seismic upgrading to bring hospitals into compliance. Mr. La Brie also reminded everyone of the National Standards which cannot be circumvented.

Dr. David Carlisle, Office of Statewide Health Planning and Development (OSHPD) Director, noted that hospitals are facing an imminent seismic structural compliance deadline. The deliberations of this Committee and the full Hospital Building Safety Board (HBSB) are needed to reach a policy direction that best serves the needs of public safety, while at the same time trying to identify the most sound seismic enforcement policy.

Mr. Paul Coleman, OSHPD Facilities Development Division (FDD) Director, elaborated on Mr. La Brie's comments regarding National Standards. Focus of most building codes are new construction; unique to California is the law that requires existing buildings to be brought up to a standard. This is why OSHPD need the input of a public body with expertise in development of codes and regulations.

Senate Bill (SB) 499 Presentation

Mr. Mohammad Karim, OSHPD Facilities Development Division, gave a PowerPoint presentation on Senate Bill (SB) 499. He began by outlining the bill. It has many "moving parts," -- one of particular interest for the committee meeting today is related to the Structural Performance Category (SPC). The SB 499 states that OSHPD may utilize Hazards U.S. (HAZUS) for determining the SPC of general acute care hospital buildings. SB 499 Non-structural Performance Category (NPC) Change Provisions are to implement conforming changes in deadlines for compliance with any NPC requirements.

SB 499 specifies that regulatory submissions for SPC ratings and NPC deadline changes shall be deemed to be emergency regulations by the California Building Standards Commission (CBSC).

Any regulation created under SB 499 shall be considered “emergency” by the CBSC. The Commission must either accept or reject the regulation within 30 days of submission. As soon as the regulations are approved and filed with the Secretary of State, they become effective.

Mr. Karim presented a chart showing seismic compliance of General Acute Care (GAC) hospitals with a total of 2,725 buildings subject to SB 1953 regulations including 845 SPC-1 buildings (about 40% of pre-1995 buildings subject to SB 1953 regulations). He then reviewed requirements for each of the SPC’s for the Committee.

SPC-1 buildings pose a significant risk of collapse and constituted a danger to the public. Original deadline for these buildings to comply with SPC-2 requirements was January 1, 2008 but may have received extensions for 2013 or 2020.

SPC-2 buildings do not significantly jeopardize life, but they may not be repairable or functional following a design earthquake. These buildings must be brought up to SPC-5 compliance by January 1, 2030.

SPC-3 are conforming buildings with pre-Northridge steel special moment frame connections. SPC-3 buildings may experience structural damage which does not significantly jeopardize life. They may not be repairable or functional following strong

ground motion. They have no compliance deadline and may be used up to January 1, 2030 and beyond.

SPC-4 buildings are conforming buildings with certain specific deficiencies. SPC-4 buildings may experience structural damage which may inhibit their ability to provide services to the public following a Design Earthquake. They also have no compliance deadline, and may be used up to January 1, 2030 and beyond.

SPC-5 buildings should reasonably be capable of providing services to the public following a Design Earthquake. They have no compliance deadline, and may be used up to January 1, 2030 and beyond.

No existing nonconforming buildings can be upgraded to SPC-3 or SPC-4. Upgrades must achieve either SPC-2 or SPC-5.

Mr. Karim then summarized the proposed SPC-related changes. Most SPC-1 buildings (with some exceptions) are eligible to apply for HAZUS collapse probability reassessments under the CAC 2010.

Mr. La Brie asked if a hospital that failed HAZUS under the CBC 2007 could pass under the new code; Mr. Karim replied that all hospitals can re-apply under the CBC 2010 for collapse probability reassessment using HAZUS.

Mr. Karim continued:

Proposed regulation will raise the collapse probability threshold for SPC 2 rating to less than or equal to 1.10%. One more significant structural deficiency shall be added to achieve better estimate of collapse probability using HAZUS.

Condition of approval for buildings with collapse probability between 0.75% and 1.10%:

- Buildings two stories or higher shall have earthquake monitoring instruments.
- Article 10 deficiencies shall be mitigated.

Mr. Karim outlined the basis of collapse probability assessment using HAZUS:

- Collapse probability depends on the presence of deficiencies. For the 449 evaluated buildings submitted to OSHPD prior to 2007, collapse probability is up to 26.05% with reported deficiencies; but with all deficiencies mitigated, collapse probability is only 1.55%.
- For the 76 buildings that received SPC-2 through evaluation, maximum collapse probability is 1.20%.
- For the CAC 2007 HAZUS evaluation, HBSB decided that the cut-off line for the SPC-1 / SPC-2 ratings should be 0.75%.
- OSHPD's proposed regulation for the CAC 2010 will raise the collapse probability threshold from 0.75% to 1.10%.

An Interested Party commented that committee should focus on the SPC-2 buildings with deficiencies that could lead to collapse. First it was considered to be three and now

the number has grown to 15. He felt that the group should focus on deficiencies that could lead to structural collapse.

Mr. Karim responded that, under current code, only 15 out of 140 deficiencies considered in the original SB-1953 evaluation are considered for HAZUS evaluation.

The Interested Party followed up that because HAZUS is so generalized in considering deficiencies, a higher number of buildings may be rating a higher probability of collapse than is actually correct.

Mr. La Brie expressed concern with the application of HAZUS in a form for which it was never intended. HAZUS is a great screening tool for the most problematic buildings but it becomes confusing when used for the definition of a collapse-hazard building.

Ms. Simin Naaseh, Committee Member, suggested that the group clarify the premise of the discussion: was it collapse prevention or not? She commented that in the context of HAZUS discussions, we are focusing on collapse probability only, whereas the SB1953 had a “loss of life” component as well. An Interested Party agreed that the group needed to examine SB 1953’s phrase “potential risk of collapse or pose significant loss of life.” Ms. Naaseh suggested reviewing past code.

Mr. Chris Tokas, OSHPD staff, read from H&SC Section 130060. An Interested Party noted that of the 900 worst buildings, 300 are not included on the graphs of the presentation because they haven’t been submitted for evaluation.

Consulting Member, Ms. Jackie Vinkler, remarked that when the study was done, it dealt with buildings whose deficiencies were mitigated, which set the benchmark for the expected starting point. The Committee wasn't defining collapse prevention before; it was defining SPC-2 buildings per SB 1953.

HAZUS Thresholds

The group expressed concern over the HAZUS threshold for collapse probability number - 1.10% was very small. Mr. Coleman suggested that the group keep in mind that HAZUS was only one approach to reclassifying a building; one could also use some form of advanced analysis or a voluntary retrofit. HAZUS had been shown to use good science, but it remained fairly untested.

An Interested Party mentioned that one-story buildings in general do not have a high probability of collapse. If the worst SPC-2 buildings have a 1.20% probability of collapse, that's acceptable. There is a process in place to identify 15 deficiencies, may be 16, and then to add penalties; the most important thing is the seismicity of the site. He felt that the group should go to a higher threshold number. Another Interested Party commented that most methods over-predict damage to short (one- or two-story) buildings.

Ms. Naaseh pointed out the definition of *probability of collapse*, defined in the CAC 2010 Section 1.2: *the fraction of building that is expected to collapse given the ground motion, and that* it was a very different definition from the probability of collapse of the

overall building that is being used in this context, and she asked about the significance. Mr. Tokas responded that each building in HAZUS, based on the level of damage it sustains, assumes that *x* portion is going to be totally collapsed (i.e., it was a generalized definition from HAZUS).

Ms. Naaseh remarked that in 2007 the Board decided on HAZUS as an assessment tool for establishing the probability of collapse, and probably agreed that setting a low collapse threshold would also encompass the prevention from significant risk to life; presumably because the group couldn't otherwise quantify the "significant risk for loss-of-life" part of the statute. She wondered if, by changing the threshold from 0.75%, the Commission might be compromising that part of the statute. Mr. Martin replied that the question was whether the Commission was comfortable raising the threshold to 1.10% or a similar number. Mr. La Brie remarked that 1.10 threshold for SPC-2s is a reasonable benchmark. As was stated earlier, HAZUS was a tool for ranking the best and the worst.

Mr. Martin asked the Committee to give its recommendation. Ms. Naaseh felt that 1.10% will be good recommendation. Committee Member, Ms. Jennifer Thornburg, stated that if the basic intent of using HAZUS was to screen structures that look like SPC-2, then 1.20% as the cutoff made the most logical sense. Ms. Vinkler agreed. Mr. La Brie was most comfortable with 1.10% although he agreed with prior comments that such a small difference in percentage (1.10% vs. 1.20%) was "slicing the tomato unnecessarily thin."

The Committee discussed the question of occupancy of the buildings - occupied vs. unoccupied. Mr. Coleman commented that we should consider the intent of the law: was it to prevent the building from falling down or was it to save the lives of the patients in acute care? That and other factors such as proximity to other buildings should be considered.

An Interested Party commented that other avenues exist for hospitals to get to the SPC-2 level, such as upgrading the buildings. Another Interested Party disagreed; they have surveyed hospital Owner's and 36% cannot afford to get to SPC-2 by upgrade.

A motion was made by Mr. La Brie to revise cut score for collapse probability of SPC-2 buildings from 0.75 to 1.10, seconded by Ms. Naaseh, but motion failed.

MOTION: Motion/Seconded/Carried (M/S/C) [Vinkler/Thornburg]
The group unanimously agreed to revise the cut score for HAZUS from 0.75% to 1.20%.

Chair Martin brought forward another issue from Mr. Karim's presentation: the recommendation that, by January 1, 2015, buildings of two stories or higher with a collapse probability of >.75 shall have earthquake-monitoring instrumentation. Mr. Coleman clarified that this pertains only to buildings that have been re-assessed to HAZUS SPC-2.

Mr. Karim stated that, per the regulations, the instrumentation will be installed by the owner but OSHPD will maintain it. The rationale was that HAZUS was originally written

to calculate probable maximum loss for a group of buildings and OSHPD subsequently enlarged the scope of HAZUS by using it as a tool for ranking the building.

An Interested Party remarked that four earthquake-monitoring instruments were not enough to result meaningful data. Another Interested Party was concerned that the chances for OHSPD's instrumentation plan to get useful data were small. FEMA had 14 model building types; during the next 15 years, possibly two of the instrumented buildings would experience an earthquake. The SPC-1 buildings should be instrumented as they would be the ones to collapse in an earthquake (this level of instrumentation was not adequate to address the issue). .

An Interested Party commented that if instrumentation was focused in buildings with greater seismic risk, the investment made would produce more meaningful results. Ms. Thornburg noted that in HAZUS, the probability of ground motion is incorporated into the probability of collapse.

Mr. Coleman commented that last summer he gave testimony before legislators and legislative staff; the lack of available data with which to make policy decisions became extremely apparent. That's why SB 499 required additional data regarding SPC-1 buildings. Also, the Committee was using HAZUS in a manner for which it wasn't initially designed to categorize buildings. Mr. Coleman felt that the Committee didn't have sufficient data to ensure that it was making the right decisions. There was a need to obtain meaningful data for the future and these buildings provided a good starting point.

Ms. Naaseh agreed that obtaining data is good – the question was how to get the right amount of data to validate this displacement based tool. Mr. Karim remarked that according to the current code language, there should be enough instrumentation to characterize the building. The number of instruments could be open depending on the building.

The Committee moved on to discuss Article 10 which concentrated on a specific set of items: *"This Article sets forth general requirements that apply to non-structural elements related to life safety issues."* Mr. Tokas explained that Article 10 deals with the evaluation of elements that are not part of a force-resisting system such as walls and partitions. Proposed regulation stated that SPC-2 buildings with collapse probability higher than 1.10% must address these non-structural elements by the 2015 deadline. Buildings with collapse probability <.75% will not have to fix the Article 10 deficiencies. Mr. Coleman stated that this should have been considered in HAZUS originally.

MOTION: (M/S/C) [Vinkler/La Brie].
The group unanimously accepted the Article 10 language as written by OSHPD in the draft emergency regulations to include only the following deficiencies: 10.1.1.1 (masonry partitions), 10.1.2.2 (cladding panels), 10.1.6 (parapets, cornices, ornamentation and appendages), 10.1.7 (means of egress) and to eliminate the remaining deficiencies.

Mr. Martin opened a discussion on the extension of the deadline for owners to submit hospital buildings to be considered for reclassification (Seismic Evaluation Procedures, 1.4.5.1.2.2). He posed the question of whether a deadline is needed at all; hospital owners know their responsibilities for SPC-1 buildings.

Ms. Vinkler asked about owners who did not submit before because they thought they were going to fail – could they submit now? The answer was a firm yes. Mr. Coleman noted that hospitals know what the statutory mandate is for seismic compliance. It's up to them to schedule their submittals, work, approvals, permits, construction, etc. so they meet the statutory deadline. The question arose as to whether the Committee should dictate the deadline or leave it open and put the responsibility back on the hospitals.

Mr. La Brie remarked that if there were no deadline, those hospitals that haven't submitted may do it quickly; whereas, with a deadline they may wait until the last minute. Mr. Coleman noted that SB 499 requires hospitals to submit annual reports to OSHPD which include the steps they are taking toward meeting the compliance deadline.

MOTION: (M/S/C) [Naaseh/La Brie]
The group unanimously agreed to retain the deadline date of July 1, 2011 as proposed in the draft emergency regulations.

Mr. Martin directed the Committee to look at the proposal to add "load path" to the list of Significant Structural Deficiencies (Seismic Evaluation Procedures, 1.4.5.1.2.2.2.2).

Committee members were concerned specifically about the adequacy of the path and how to demonstrate it.

Discussion ensued about possible elements for mitigating load path deficiencies and slab capacities. Mr. La Brie remarked that the inclusion of load path was reasonable. With some buildings, the load path is obvious; others are more tricky and may need a computer model. Mr. Tokas wanted to shut the door on poor load paths, not on every load path –every load path must be reasonable.

MOTION: (M/S/C) [La Brie/Thornburg]
The group voted to accept the requirement for load path to the Significant Structural Deficiencies list as written in the draft emergency regulations.

The Committee then discussed Section 7.1.4 from the Code regarding openings at shear walls: *"Diaphragm openings immediately adjacent to the shear walls constitute <25% of the wall length and the available length appears sufficient."*

Define the Threshold Between SPC-1 and SPC-2

Mr. Martin remarked that HAZUS had been used to rank the most critical buildings, and some buildings were being reclassified as SPC-2 (Life Safety) based on HAZUS. The definition of the difference between SPC-1 (Probability of Collapse) and SPC-2 (Life Safety) is whether or not the building can pass the criteria. An owner might correct the worst deficiency and then consider the building to be SPC-2; is the term "Life Safety"

then appropriate? Mr. Martin and other Committee members decided to discuss the terminology at a later date.

HAZUS Evaluation and Facility Upgrade

Mr. Karim walked the group through the procedure of upgrading a building from SPC-1. He stressed that HAZUS was not designed as a retrofit tool. Under the 2007 code, when an owner of a SPC-1 building did a voluntary seismic upgrade, he/she could submit the changed building for HAZUS evaluation. If the building did not pass, it was locked in to SPC-1. All buildings that complete seismic retrofit prior to July 1, 2010, can re-submit their buildings for HAZUS re-assesments. All self-declared SPC-1 buildings can be evaluated using original SB-1953 evaluation requirements at any time. It's a loophole in the timeframe for the current deadline.

The Committee was interested in the possibility of mitigating a single element – would that qualify as a building retrofit? Mr. Karim explained that the element must comply with Life Safety and that a retrofit may involve mitigating just one element if it was causing the SPC-1 rating. He provided examples involving shear walls and load paths.

NPC-3 Issues

Mr. Martin posed the question of whether it made sense to have an NPC-3 requirement that was tied in to the old seismic zones rating. The Committee felt that this issue could

be discussed at the next day's Non-Structural Committee meeting as it was an item on that agenda.

Comments on Non-Agenda Issues

Mr. La Brie expressed his concern that the Code Application Notice (CAN) for upgrading and mitigating deficiencies used a voluntary upgrade approach for satisfying the HAZUS deficiency and being reclassified accordingly. He asked how this would affect the understanding of the overall performance of the building. Mr. Karim responded that a building can be upgraded at any time and HAZUS was a separate issue (in OSHPD's opinion). The goal was to eliminate collapse hazards as an interim deadline to the 2030 compliance.

An Interested Party asked about voluntary seismic upgrades. For the past 30 years the rule of thumb has been "don't make the building worse." He agreed with using HAZUS in that way, but what about back checking? Is a 1% increase in stress "worse," or is it 5%? What are the criteria for deciding what constitutes "worse?" Mr. Karim responded with the definitions of incidental and minor which are different from element level stresses. In the next code, the element level acceptance threshold will go from a 5% stress to 10% on any existing component.

An Interested Party observed that there was a very big step between HAZUS validation, which included voluntary upgrades, and the actual analysis and upgrade. The SPC-2 level involved all elements of the building, as opposed to the key elements of SPC-2

which formed the deficiencies. Since the timeframe was 15 years, maybe the Committee should not seek to make a building wholly compliant, when some parts are known to be noncompliant but don't matter.

Adjournment

Mr. Martin thanked Mr. Karim for his contribution and adjourned the meeting.